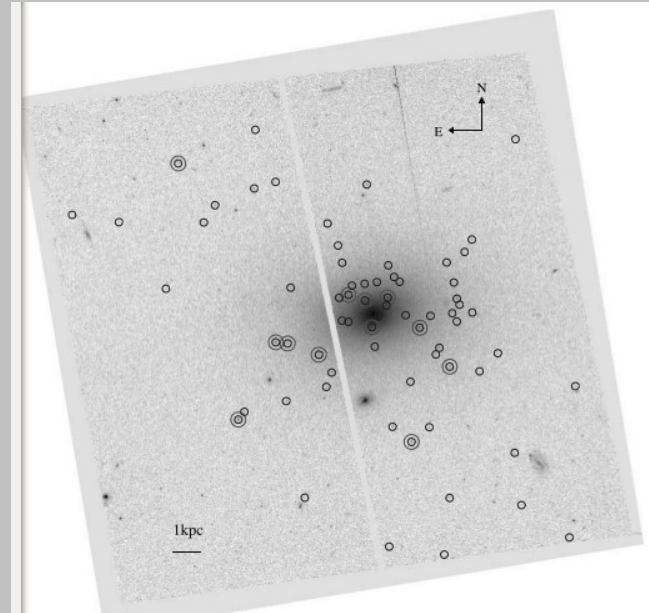
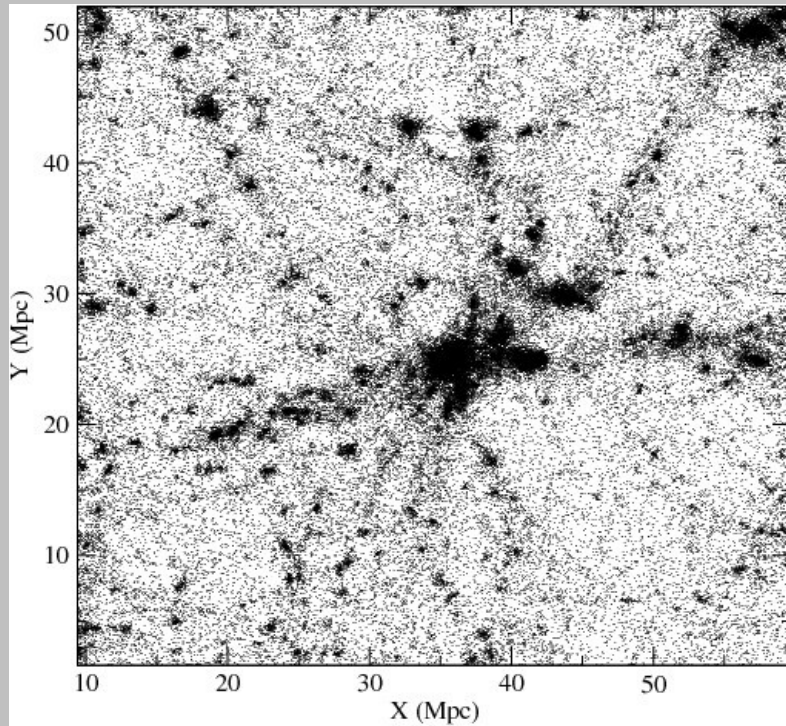


# Harassment of Early Type Dwarfs with rich Globular cluster systems: **Sensitivity to orbit**

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*VCC1087  
with  
extended  
rich GCS*



**Ruben Sanchez-Janssen & Laura Ferrarese (Victoria)**

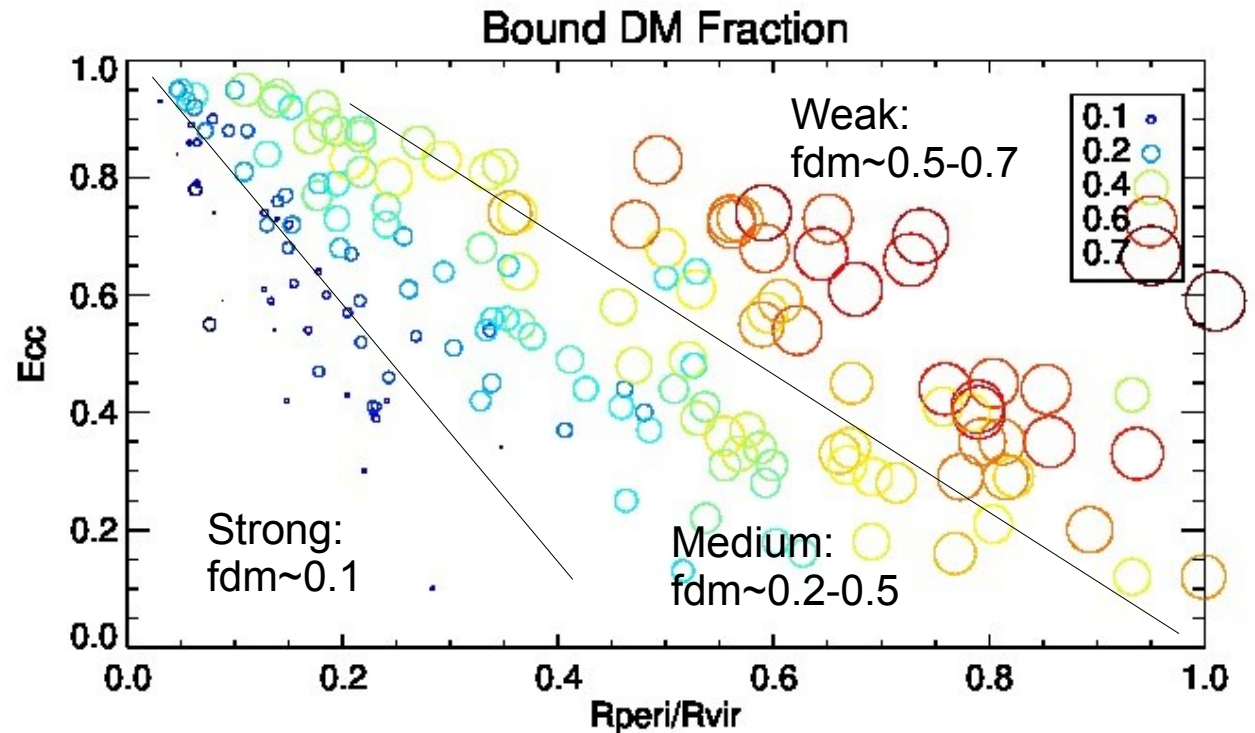
**Thomas Puzia (PUC),**

**Brad Gibson (Preston),**

**Alfonso Aguerri & Mike Beasley (IAC)**

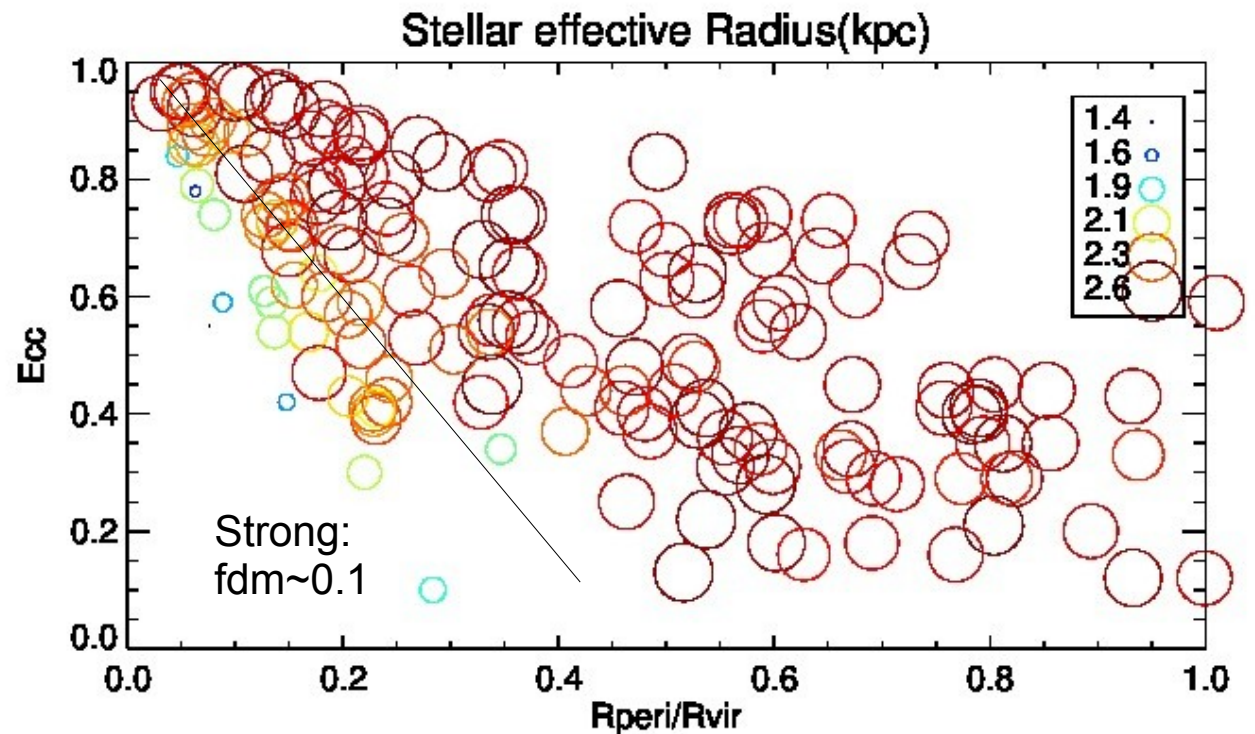
# DM losses

- Circular orbits at small  $r_{\text{peri}}$  are most destructive.
- But can still be destructive at higher eccentricity if  $r_{\text{peri}}$  is very small



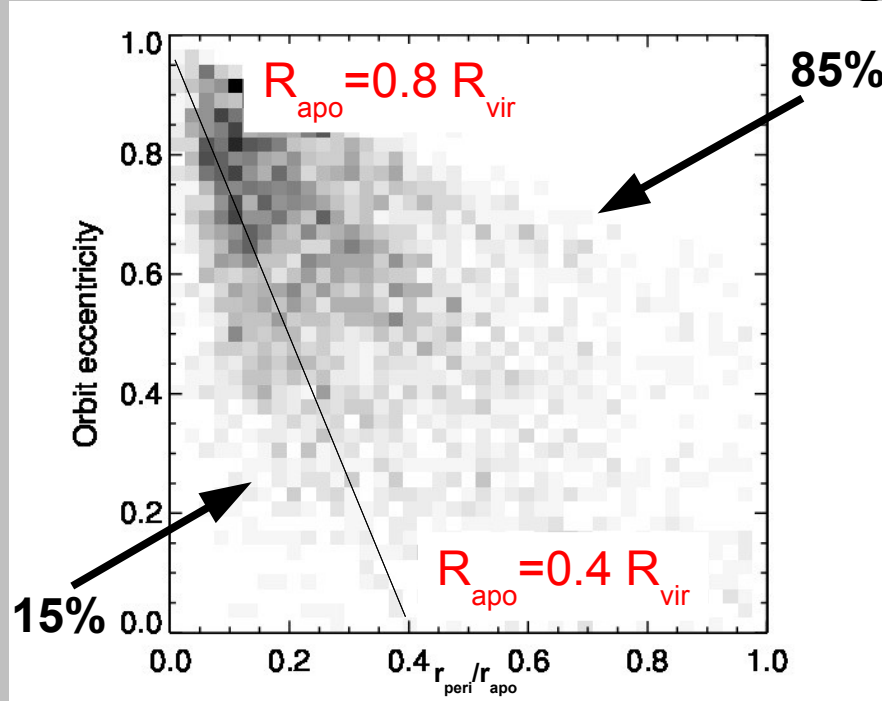
# Disk size

- Strong harassment, stellar disks are truncated
- Most disks totally unaffected

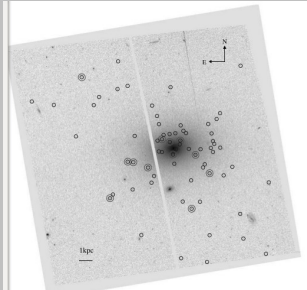




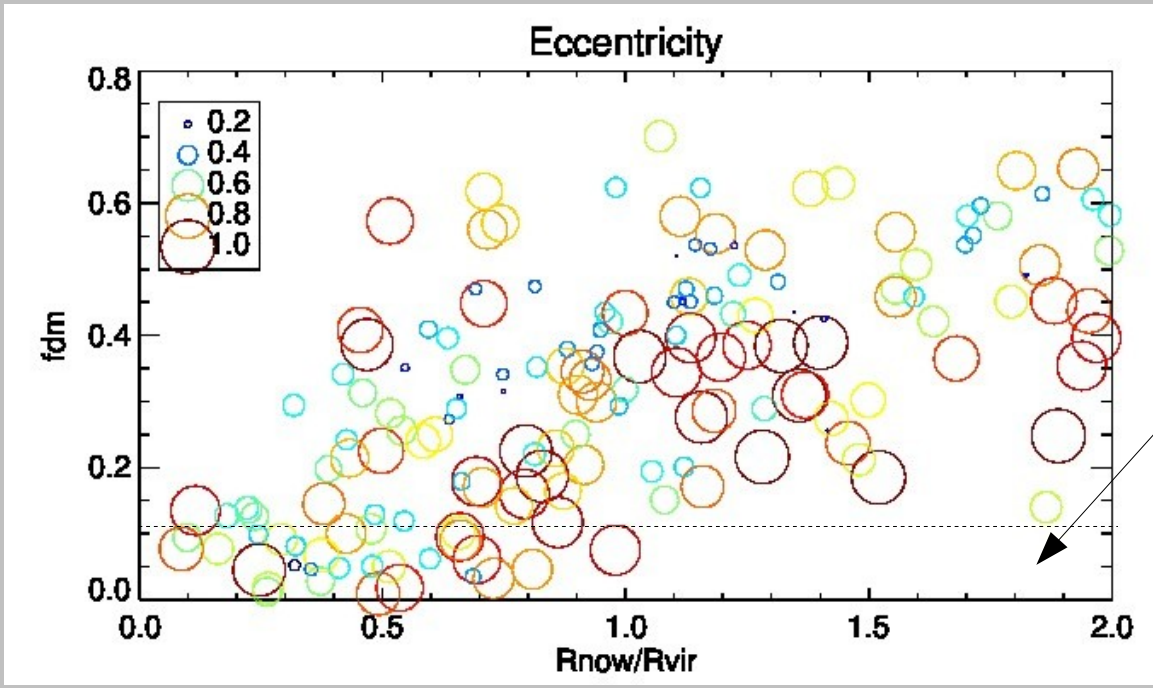
# Where are harassed galaxies found now?



1) Most galaxies (85%) unaffected by harassment after many gigayears in cluster



VCC1087 is likely one of these?

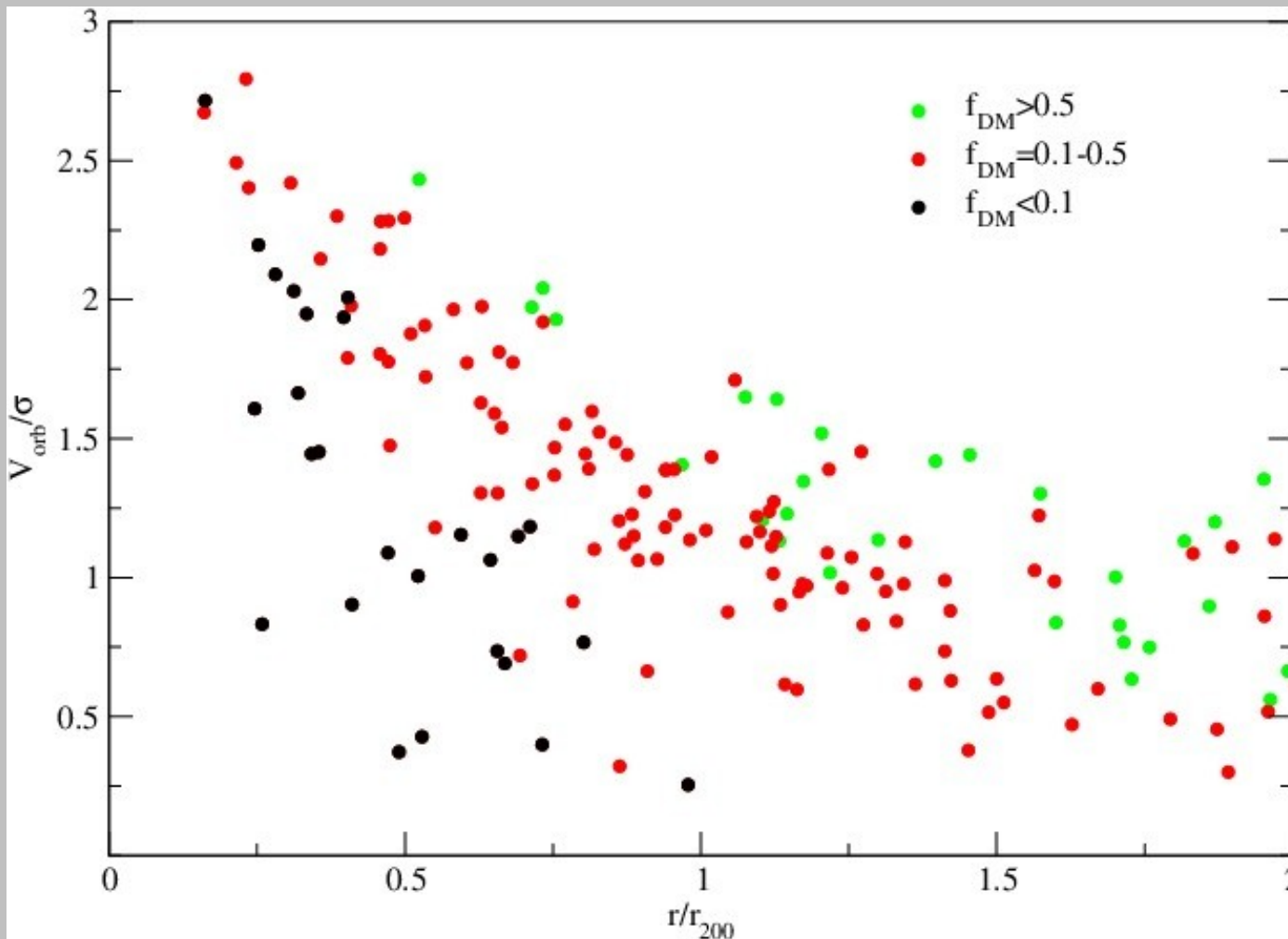


2) Those effected (15%) are **spread throughout cluster** by range of eccentricity

Strong Harassment

3) To get to large radii, galaxies with eccentric orbits must climb out of the potential well → **lower orbital velocities**

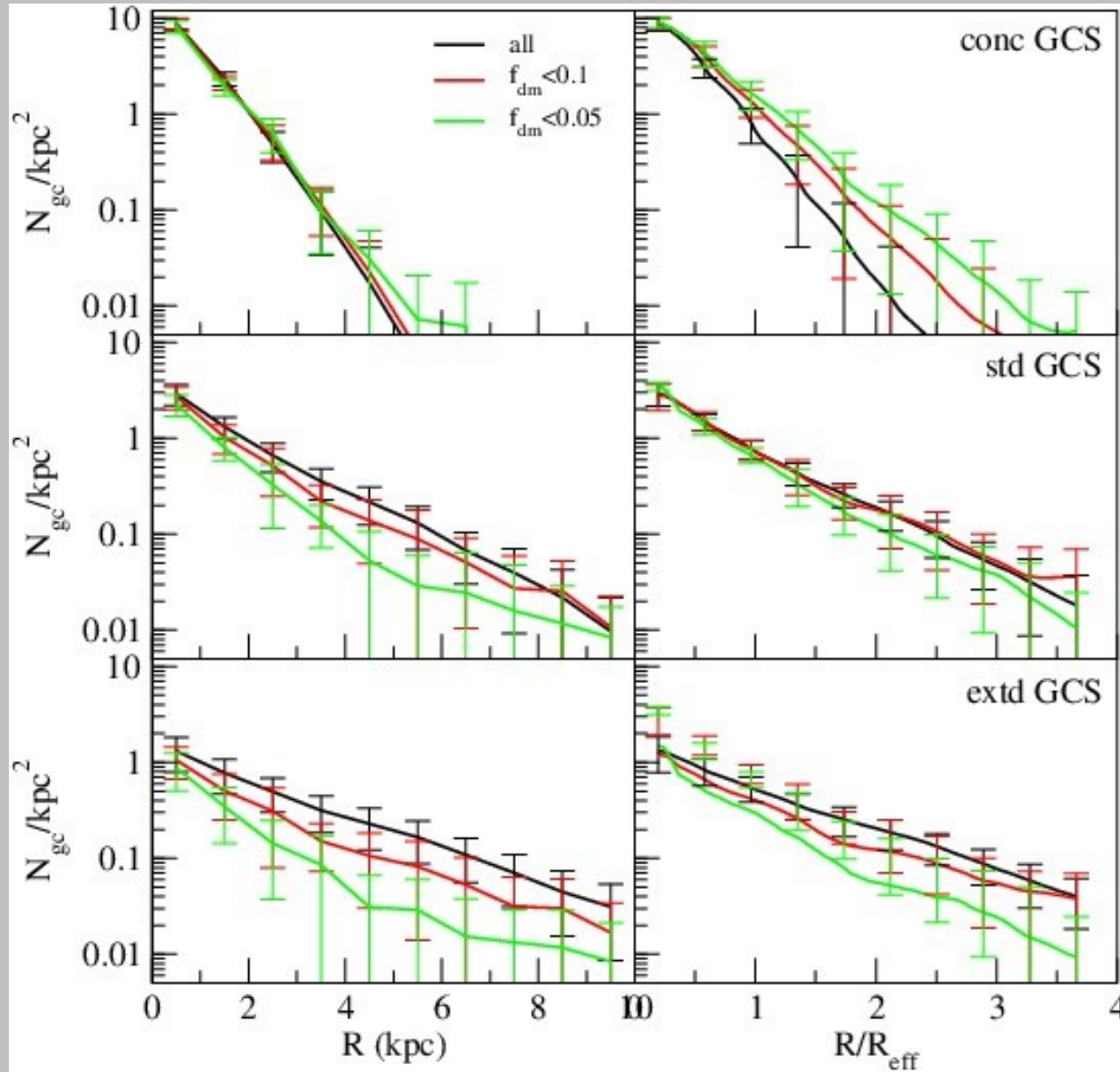
# Harassed galaxies in phase space:



- Strongly and weakly harassed dwarfs separate in phase space
- Strongly harassed galaxies found at systematically lower orbital velocities
- Similar results found for galaxies in cosmological simulations too!

Phase-diagrams maybe useful tools for identifying galaxies with high probabilities of having suffered strong mass loss

# Change in GC profile shape (left: $R$ , right: $R/R_{\text{eff}}$ )



*Stars preferentially truncated*

*Roughly equal truncation of stars & GCS*

*GCS preferentially truncated*

*No change unless strong harassment*

*Then profile steepens then flattens out at large radius*

Detecting effect of harassment on GCS profile depends on initial distribution, and strength of harassment